CLAIMS:

1. A nonlinear medium comprising a first segment of HNLF (highly nonlinear fiber), a segment of single mode fiber and a second segment of HNLF connected together in sequence.

2. A multi-wavelength laser source comprising:

a source of an optical signal having optical pulses at a channel spacing frequency;

an amplifier for amplifying the optical signal to produce an amplified optical signal;

a nonlinear medium according to claim 1 connected to receive the amplified optical signal, and to yield comblike multi-channel WDM laser signals separated from each other by said channel spacing frequency.

3. A multi-wavelength laser source according to claim 2 wherein the source comprises:

a first monochromatic laser generating a first output signal having a first (f_1) lasing frequency;

a second monochromatic laser generating a second output signal having a second (f_2) lasing frequency, the second lasing frequency differing from the first lasing frequency by said channel spacing frequency;

a combiner for combining the first output signal with the second output signal to generate the optical signal.

4. A multi-wavelength laser source according to claim 2 wherein the source comprises:

a first monochromatic laser generating a first output signal having a first (f_1) lasing frequency;

a modulator adapted to modulate the first output signal to generate said optical signal.

5. A multi-wavelength source according to claim 2 wherein:

the HNLF has a dispersion zero at 1542 nm ± 3 nm and a dispersion slope of $S_D \leq 0.04 ps/Km \bullet nm^2$ with effective mode area $A_{eff} \leq 20 \mu m^2$, and wherein the first segment of HNLF is from 150 to 250m long, the second segment of HNLF is from 250 to 350m long, and the segment of SMF is 50 to 120m long.

6. A multi-wavelength source according to claim 5 wherein:

the HNLF has a dispersion slope of about $S_D = 0.031 ps/Km \bullet nm^2$ with effective mode area about $A_{eff} = 10 \mu m^2$ and wherein the first segment of HNLF is about 190m long, the second segment of HNLF is about 288m long, and the segment of SMF is about 80m long.

7. A multi-wavelength source according to claim 3 wherein the two monochromatic lasers are tuned to 1546.119 nm and 1546.916 nm respectively, and

the HNLF has a dispersion slope of about $S_D = 0.031 ps/Km \bullet nm^2$ with effective mode area about $A_{eff} = 10 \mu m^2$ and wherein the first segment of HNLF is about 190m long, the second segment of HNLF is about 288m long, and the segment of SMF is about 80m long.

8. A multi-wavelength source according to claim 3 wherein the two monochromatic lasers comprise two DFB lasers tuned to 1503.472nm and 1504.227nm respectively, and HNLF has a dispersion zero at 1508nm ± 3 nm, and wherein the first segment of HNLF is from 250-800m long, the segment of SMF is from 50-120m long, and the second segment of HNLF is from 400-750m long.

9. A multi-wavelength source according to claim 8 wherein the first segment of HNLF is about 400m long, the segment of SMF is about 80m long, and the second segment of HNLF is about 500m long.

10. A multi-wavelength source according to claim 2 wherein the first segment of HNLF is about 190m long, the segment of SMF is about 70m long, and the second segment of HNLF is about 288m long.

11. A multi-wavelength source according to claim 3 adapted for 50 GHz channel spacing, wherein the two monochromatic lasers comprise two DFB lasers tuned at a 50 GHz channel spacing to 1546.119 nm and 1546.517 nm, and wherein the first segment of HNLF is from 120m to 250m long, the segment of SMF is from 250m to 400m long, and the second segment of HNLF is longer than 250m.

12. A multi-wavelength source according to claim 11 wherein the first segment of HNLF is about 190m long, the segment of SMF is about 350m long, and the second segment of HNLF is about 288m long.

13. A multi-wavelength source according to claim 3 adapted for 50 GHz channel spacing, wherein the two monochromatic lasers comprise two DFB lasers tuned at a 50 GHz channel spacing to 1560.606 nm and 1561.419 nm, and wherein the first segment of HNLF is from 300m to 600m long, the segment of SMF is from 50m to 120m long, and the second segment of HNLF is from 450m to 700m long.

14. A multi-wavelength source according to claim 13 wherein the first segment of HNLF is about 400m long, the segment of SMF is about 80m long, and the second segment of HNLF is about 500m long.

15. A nonlinear medium comprising a first segment of DSF of a first type, a second segment of DSF of a second type, a segment of SMF, and a segment of HNLF connected together in sequence.

16. A multi-wavelength laser source comprising:

a source of an optical signal having optical pulses at a channel spacing frequency;

an amplifier for amplifying the optical signal to produce an amplified optical signal;

a nonlinear medium according to claim 9 connected to receive the amplified optical signal, and to yield comblike multi-channel WDM laser signals separated from each other by said channel spacing frequency.

17. A multi-wavelength laser source according to claim 15 wherein the source comprises:

a first monochromatic laser generating a first output signal having a first (f_1) lasing frequency;

a second monochromatic laser generating a second output signal having a second (f_2) lasing frequency, the second lasing frequency differing from the first lasing frequency by said channel spacing frequency;

a combiner for combining the first output signal with the second output signal to generate the optical signal.

18. A multi-wavelength laser source according to claim 15 wherein the source comprises:

a first monochromatic laser generating a first output signal having a first (f_1) lasing frequency;

a modulator adapted to modulate the first output signal to generate said optical signal.

19. A multi-wavelength source according to claim 16 wherein the segment of DSF of the first type is from 300 to 600m long, the segment of DSF of the second type is from 300 to 600m long, the segment of SMF is from 50 to 120m long, and the segment of HNLF is from 250 to 350m long, and the HNLF has a dispersion zero at 1542nm ± 3 nm and a dispersion slope is $S_D \leq 0.04 ps/Km \bullet nm^2$ with effective mode area $A_{eff} \leq 20 \mu m^2$.

20. A multi-wavelength source according to claim 19 wherein the segment of DSF of the first type is about 400m long, the segment of DSF of the second type is about 400m long, the segment of SMF is about 80m long, and the segment of HNLF is about 288 m long, and the HNLF has a dispersion zero at 1542nm and a dispersion slope is about $S_D = 0.031 ps/Km \bullet nm^2$ with effective mode area about $A_{eff} = 10 \mu m^2$.

21. A multi-wavelength source according to claim 19 wherein the segment of DSF of the first type is about 800m long, the segment of DSF of the second type is about 800m long, the segment of SMF is about 70m long, and the segment of HNLF is about 288m long.

22. A nonlinear medium comprising a first segment of DSF, a segment of SMF, a second segment of DSF and a segment of HNLF.

23. A multi-wavelength laser source comprising:

a source of an optical signal having optical pulses at a channel spacing frequency;

an amplifier for amplifying the optical signal to produce an amplified optical signal;

a nonlinear medium according to claim 15 connected to receive the amplified optical signal, and to yield comblike multi-channel WDM laser signals separated from each other by said channel spacing frequency.

24. A multi-wavelength laser source according to claim 23 wherein the source comprises:

a first monochromatic laser generating a first output signal having a first (f_1) lasing frequency;

a second monochromatic laser generating a second output signal having a second (f_2) lasing frequency, the second lasing frequency differing from the first lasing frequency by said channel spacing frequency;

a combiner for combining the first output signal with the second output signal to generate the optical signal.

25. A multi-wavelength laser source according to claim 23 wherein the source comprises:

a first monochromatic laser generating a first output signal having a first (f_1) lasing frequency;

a modulator adapted to modulate the first output signal to generate said optical signal.

26. A nonlinear medium comprising a segment of HNLF, a segment of SMF, a first segment of DSF of a first type, a second type of DSF of a second type connected together in sequence.

27. A multi-wavelength laser source comprising:

a source of an optical signal having optical pulses at a channel spacing frequency;

an amplifier for amplifying the optical signal to produce an amplified optical signal;

a nonlinear medium according to claim 26 connected to receive the amplified optical signal, and to yield comblike multi-channel WDM laser signals separated from each other by said channel spacing frequency.

28. A multi-wavelength laser source according to claim 27 wherein the source comprises:

a first monochromatic laser generating a first output signal having a first (f_1) lasing frequency;

a second monochromatic laser generating a second output signal having a second (f_2) lasing frequency, the second lasing frequency differing from the first lasing frequency by said channel spacing frequency;

a combiner for combining the first output signal with the second output signal to generate the optical signal.

29. A multi-wavelength laser source according to claim 27 wherein the source comprises:

a first monochromatic laser generating a first output signal having a first (f_1) lasing frequency;

a modulator adapted to modulate the first output signal to generate said optical signal.

30. A multi-wavelength source according to claim 27 the segment of HNLF is from 150 to 300m long, the segment of SMF is from 50 to 120m long, and the segment of DSF of the first type is from 300 to 700m long, and the segment of DSF of the second type is from 200 to 600m long.

31. A multi-wavelength source according to claim 30 the segment of HNLF is about 190m long, the segment of SMF is about 80m long, and the segment of DSF of the first type is about 400m long, and the segment of DSF of the second type is about 300m long.

32. A multi-wavelength source according to claim 27 the segment of HNLF is about 199m long, the segment of SMF is about 70m long, and the segment of DSF of the first type is about 500m long, and the segment of DSF of the second type is about 400m long.